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ABSTRACT

"Global outreach" refers to the international delivery of education, health, public information, commercial, and other services using appropriate communications technology. International organizations are partnering in various ways with developing-country governments, private companies, local communities, and non-governmental organizations to seize the vast new possibilities made available by networks of global information infrastructure now being built. Six of these programs are described in this paper: the World Bank; the Leland Initiative; LearnLink; the United Nations Development Program; the Open Society Institute; and the National Geographic Kids Network. Also discussed are opportunities for accelerated growth and gains for developing countries related to information technology; the potential for distance learning, other telemediated services, workforce preparation, entertainment, and book publishing are highlighted. Learning environments in developing countries are then considered, including traditional practice, content courses, technology skills, and teleprojects. Fifteen web sites that offer additional details about programs cited are listed. (DLS)

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Global Outreach:
Formal and Non-Formal Education

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What Is Global Outreach?

"Global outreach" refers to international delivery of education, health, public information, commercial, and other services using appropriate communications technology. The choice of technology—telephone, computer, satellite, videocassettes, Internet, radio, TV, or a combination of multimedia support, including printed material—depends on the local environment.

Global infrastructure is growing rapidly in information-friendly environments of the developing world. The emergence of a global superhighway is being spurred by the deployment of broadband fiber optic lines and of satellite channel capacity that will soon offer possibilities of universal coverage. Combined with wireless technologies and renewable energy resources, communications and information services are no longer limited to places with phone wires and/or with electricity. This means that children and adults in low-income areas—in remote parts of their countries with limited access to education, health, or other services—now have real possibilities for personal socioeconomic development.

Telemediated Service Delivery of Education

International organizations are partnering in various ways with developing-country governments, private companies, local communities, and non-governmental organizations to seize the vast new possibilities made available by networks of global information infrastructure now being built. Here are six of many programs sponsored by such organizations:

The World Bank. The Bank is fostering development of national strategies and priorities for information infrastructure, as well as encouraging telecommunications policy reforms needed to support an open and growing global marketplace in the new information-based economy. Privatization policies, regulatory arrangements, investment codes, and competition policy will allow telecommunications and information technology products to be traded and transactions undertaken on a cost-effective basis. The Bank sees itself as a long-term partner with its client countries in developing the alliances needed to mobilize financing and support to extend the global information infrastructure and its benefits to people in developing countries.

In addition, the World Bank sponsors the World Links for Development (WorLD) global collaborative learning program. The Program, administered by the Bank's Economic

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Development Institute, links students and teachers in secondary schools in developing countries with their counterparts in industrialized countries for collaborative research, teaching, and learning through the Internet. Over a four-year period (1997–2000) the Program aims to link 1,500 secondary schools in 40 developing countries with partner schools in Australia, Canada, Europe, Japan, and the United States. Currently there are 105 WorLD schools on-line in ten countries.

The Leland Initiative. A five-year $15 million U.S. Government program launched in 1996, the Leland Initiative is administered by the USAID Bureau for Africa, Office of Sustainable Development, to extend full Internet connectivity to twenty or more African countries to promote sustainable development. The program is designed to support policy reform to reduce barriers to open connectivity, to work with both host governments and the private sector in facilitating Internet access by providing low-cost, high-speed access to the Internet, and to introduce proven mechanisms to build networks of active users. The countries selected for the program to date are Benin, Botswana, Cote d'Ivoire, Eritrea, Ethiopia, Ghana, Guinea Bissau, Guinea-Conakry, Kenya, Madagascar, Malawi, Mali, Mozambique, Namibia, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe.

LearnLink. USAID also funds, through its Human Capacity Development Center, the LearnLink program conducted by the Academy for Educational Development to strengthen learning systems for sustainable development. Its website disseminates various publications and its staff provides consulting support to ministries of education, groups, and individuals trying to apply technology to improving basic education. LearnLink is working with USAID missions in various countries to set up Municipal Learning Centers to expand both formal and non-formal education.

United Nations Development Program. The UNDP funds and administers the U.N. Sustainable Development Network, founded in 1992, to link government bodies, universities, non-governmental organizations, the private sector, and individuals to exchange information on sustainable human development. Hewlett Packard has agreed to assist the Program in its first phase in building an on-line information access and communication network in 16 countries—using HP Internet hardware and software along with other technologies—which supports Internet connectivity to developing countries worldwide. This partnering of public and private sector in expanding Internet access and information technology to developing countries becomes a model for political access and developing-country gain.

Open Society Institute. The Soros Foundation's Open Society Institute provides Internet connectivity in Central and Eastern Europe and the former Soviet Union. Under its Regional Internet Program, the Institute funds pilot projects which provide Internet access, training and support to libraries, schools, medical institutions, NGOs, independent media, and others. Since 1994, the Program has funded over 80 projects in 28 countries, with an annual budget of approximately $10 million.

National Geographic Kids Network. The National Geographic Society has partnered with the Soros Foundation, USAID's NGO program for Russia, foundations of various corporations, and ministries of education to provide localized versions of Kids Network materials and teacher in-service in a number of countries over the past 10 years. Its innovative curricula

guide teachers in inquiry-based pedagogy and help them integrate technology use with basic content in science and geography.

Opportunities for Accelerated Growth and Extraordinary Gains

The information revolution offers dramatic opportunities for information and service access to all countries worldwide. However, it is the developing countries that stand to gain most from the revolution in technology because their current infrastructure is inadequate, and the new explosion in technology allows them to leapfrog over yesterday's industrial age and traditional technologies into today's and tomorrow's knowledge- and technology-based economies. There is no need to lay expensive copper wires for phone lines to establish communications, nor to forego communications to outlying areas. The Internet now offers access to information and connections to the world. Other global information infrastructure, such as low-orbiting satellite systems now being deployed, will expand opportunities.

Developing countries also stand to gain from the extensive outreach potential of information technology. The Open University in the U.K., designed originally to provide distance learning largely through correspondence and printed material, now makes use of information technology and serves as a model for new international universities, such as the Indira Gandhi National Open University (IGNOU) in India. The outreach of such universities is virtually unlimited.

To see the potential at the local level, one only need visit the densely populated Mahmelodi Township outside Pretoria, South Africa. There, teacher training is ongoing, making use of the Internet, as well as television broadcasting provided through alliance with a nearby private school.

The potential gains by developing countries are expanded also by the versatility of uses of information infrastructure. It can deliver a full array of public and private telemediated services: formal and non-formal education, health, public information, commerce, public administration. Further, it offers a diversity of tools to the user: writing, communicating, calculating, graphics. It can improve workforce preparation, on-the-job training, and—especially powerful in remote areas—entertainment and opportunities to produce entertainment or edutainment products.

The cost-saving potential of the new technology is a subject of much debate. But clearly it bypasses the cost of building traditional infrastructure, such as the copper wiring of telephone lines referred to earlier. Other examples of cost savings are in book publishing, which can be carried out on a desktop computer by any knowledgeable user. Book distribution can also be facilitated by personal computer. The distribution capability avoids many intermediate steps and intermediaries that in the developing world can be a major impediment. Overhead costs or the operational costs of administration are similarly reduced for telemediated service delivery.

Finally, the localization potential unleashed by information infrastructure can bring extraordinary benefits to developing countries. In the Mahmelodi Township program cited above, the community, once exposed to the possibilities of the Internet and other forms of telemediated service delivery, played a major role in developing a program to bring information technology into the township to train teachers and build basic work skills. The

community has formed its own Mahmelodi Township Community Information Service, and realizes its decision-making capability, as well as its own empowerment. The Township program also illustrates implementation of distance learning in different learning environments. In the Township, teacher in-service is carried out individually with personal computers at the community service center; the nearby school's Information Center provides a computer lab and TV broadcasting for groups of teachers and other trainees. The teachers are then responsible for teaching multiple groups of students throughout the Township.

Learning Environments in Developing Countries

Traditional Practice

Formal education, where available in the developing world, has emphasized memorization, lecture and recitation, and an elitist system of examinations for entry into each higher level. Typically, formal education is funded and controlled by a central Ministry of Education that lacks resources to provide equal opportunities for low-income and remote areas. One commonly finds classrooms with poorly trained teachers and few if any materials beyond a blackboard. The emerging technology infrastructure offers opportunities to meet growing demand for equity and to introduce innovative teaching methods that address individual differences in learning styles and motivation.

Radio and television broadcast have been used for decades as the most cost-effective ways to deliver educational content to large numbers of people over a vast territory, especially as non-formal education in the form of public service presentations on health and socioeconomic topics. In many places, people receive such broadcasts in a public place, such as a community center or a bar, because they lack electricity or a radio or TV in their homes and schools. The desire for information of all kinds tends to be even greater than in the developed world because the supply has been so limited. And, even in remote villages, adults are aware of the Information Age revolution and don't want to miss opportunities for themselves and their children. Thus, teachers and other people are more willing to share resources and to accept a level of inconvenience that most Americans would reject.

Emerging Learning Environments in Developing Countries

The various international outreach programs and the Mahmelodi Township Community Information Service example cited above fall into three main approaches, all of them useful in teacher pre-service and in-service education:

- Distance learning courses in content areas
- Workforce preparation and on-the-job training in use of information technologies
- Telecollaborations with distant peers

Content courses. Distance learning courses via radio and TV tend to follow traditional teacher-centered practice, but in combination with Internet connections these courses are now becoming enriched by materials that can be printed locally from computers and by synchronous and/or asynchronous interaction between the teacher and remote learners. Teaming up to share technology resources offers benefits to the more affluent universities and private schools as well as to poor public schools and communities. For example, teachers from poorer schools are invited to come to private schools for training and to obtain downloaded content and teaching materials, and the private schools benefit from financial

support and in-kind donations of equipment and Internet access to be shared widely. Highly compressed video will soon make possible acceptably affordable videoconferencing through POTS phone lines, but a centralized TV outreach to masses of learners may remain still cheaper. E-mail is the most likely medium of interaction because of the high cost of phone use, until or unless telecommunication rate reform is more dramatic and widespread.

Technology skills. Technology training is best done in a computer lab where students can have individual access to equipment. Such labs are being set up in municipal centers, universities, and private schools used 7 days a week and as much as 24 hours a day to maximize use of precious facilities. Although such training includes web page design and Internet search techniques, use of the Internet is usually constrained by per-minute access rates. Caching of websites and heavy reliance on e-mail, gopher, and other text-based communication is essential. Without flat-rate access, extended Web browsing by individuals is prohibitively expensive. More emphasis is placed on basic keyboarding, productivity applications, and troubleshooting than on Internet use, which is likely to be limited to skilled users who will share their downloaded information on floppy disks or paper.

Teleprojects. Telecollaborations among distant schools are exciting to teachers and learners in all countries. They offer the prospect of a student-centered learning environment emphasizing inquiry and project-based assessment. However, they are not as easy to launch or sustain as many assume. Although American teachers and students want information and personalized communication with people in exotic places, they often do not understand the constraints (access fees, shortage of equipment, curriculum mandates) of their counterparts in the developing world.

NGS Kids Network has had considerable success in introducing student-centered teaching methods in places such as Namibia, Mexico, and Russia because it is designed for use in such constrained circumstances. Its curriculum is rich in content, process skills, and assessments which give it credibility with ministry and school administrators. Its use of technology, while integral to the curriculum, is designed for flexibility, allowing affluent schools to send as much multimedia information as they wish but also allowing meaningful participation by as many as 200 students with just one computer not necessarily in the school building. The software for Kids Network, called NGS Works, facilitates creation and rapid transmission of various kinds of cross-platform files (text, graphics, database, maps, graphs) by children and their teachers. Automated formation of geographically diverse teams of about 10 classes investigating the same topic during the same 8-week period reduces service overhead cost. Automated compilation of data from thousands of classes allows all participants to share research results from thousands of schools.

Meeting places for like-minded educators are proliferating on the Web, including such programs as the World Bank's WorLD (World Links for Development). For educators who want to develop their own collaborative projects, the following guidelines—based on NGS Kids Network's decade of experience—will help produce a successful international teleproject:

- Allow an academic year for collaborative *preparation* of a project, from identifying a willing partner to agreeing on goals, methods, activities, and timetable.
- Provide motivational entry points for *both* teachers and students.
- Focus on a "driving question" for a period of several weeks or months.

- ❖ Investigate a problem of significance locally and globally for all partners.
- ❖ Plan for tangible results for authentic assessment of students' progress.

Conclusion

The revolution in telemediated education is rapidly reaching into remote corners of the globe, opening real opportunities for bootstrapping socioeconomic development in developing countries and for direct contact between teachers in developed countries and populations they know little about. Global outreach need not be limited to international organizations. American universities, secondary schools, and even elementary schools and after-school organizations can help formal and non-formal education in the developing world. And it's not a one-way street. The models emerging in the developing world for sharing physical plant, computers, Internet access, and master teaching skills may provide some valuable ideas for our own at-risk populations.

References

The following websites offer additional details about programs cited in this paper:

The World Bank's WorLD Links for Development
http://www.worldbank.org/worldlinks/english.htm

The Leland Initiative of the U.S. Government (USAID funded)
http://gaia.usaid.gov/regions/afr/leland/project.htm

The LearnLink program of the Academy for Educational Development (USAID funded)
http:www.aed.org/learnlink/

The United Nations Sustainable Development Network (UNDP funded)
http://www.un.org/esa/sustdev/edu.htm

The Regional Internet Program of the Open Society Initiative (Soros Foundation funded)
http://www.soros.org

The National Geographic Society
http://www.nationalgeographic.com

The following websites provide additional examples of successful international teleprojects:

http://teaparty.terc.edu/
TERC Inc.'s NSF-funded testbed for telecollaborations, including the CLEO project for posting student-initiated investigations

http://teaparty.terc.edu/ll/ho/html/helloindex.html
For a peek at coming Web-based supplement to the introductory National Geographic Kids Network unit *"Hello!"*

http://www.iearn.org/
I*EARN's international community service projects

http://quest.arc.nasa.gov/
NASA's resources and Quest projects

http://globe.hq.nasa.gov/
NASA's GLOBE projects

http://www.learner.org/jnorth/
Journey North project

http://www.gsn.org/project/index.html
The Global Schoolhouse Network

http://landmark-project.com/ggl.html
The Global Grocery List Project

http://www.teleproj.com/
ASTL (Art, Science, & Technology in Learning) Project

Autobiographical Sketches

Mary Oakes Smith is a manager in the World Bank's Africa Region, responsible for developing strategies and applications for telemediated service delivery. She has recently been appointed to the Advisory Board of the United Nations International Partnership Trust Fund, established to work with the United Nations Foundation to advise on the programming of the $1 billion gift from Ted Turner to the UN. In 1997, as a Learning and Leadership Center Fellow of the World Bank, she pursued with academia, industry, and foundations methods and experiences applicable to developing low-income country access to delivery of various services using appropriate communications technology. She managed industry, telecommunications, and energy operations in West Africa from 1990 to 96, and before that was a manager in the finance department responsible for supporting negotiations of the $14–17 billion soft loan fund (IDA) of the World Bank.

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Monica Bradsher is an independent consultant focusing on educational technology for K-12 in the USA and abroad, advising the National Geographic Society, USAID's Human Capacity Development Center, Management Systems International, and others. Until recently, as Managing Editor for Educational Media at National Geographic, she led development of computer courseware and of NGS Kids Network, which she founded in 1986 and expanded to include participants in 50 countries. Monica also has taught technology courses, in person and online, for the University of California/Irvine's Department of Education. Before joining the National Geographic staff in 1980, she was a classroom teacher for 10 years in grades 3, 5, 6, and 9 in Massachusetts, Hong Kong, Virginia, and Washington, DC, and lived abroad in India (one year) Russia (five years) and Hong Kong (five years). She holds an MEd from Harvard.

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